Abstracts

The Performance of a New Direct Contact Applicator for Microwave Diathermy

G. Kantor, D.M. Witters, Jr. and J.W. Greiser. "The Performance of a New Direct Contact Applicator for Microwave Diathermy." 1978 Transactions on Microwave Theory and Techniques 26.8 (Aug. 1978 [T-MTT] (Special Issue on Microwaves in Medicine, with Accent on the Application of Electromagnetics to Cancer Treatment)): 563-568.

A direct contact applicator, specifically designed for microwave diathermy at the Industrial, Scientific Medical (ISM) frequency of 2.45 GHz was evaluated by studying near-field patterns in free space, thermographic heating patterns in phantoms of simulated fat and muscle tissue, and associated leakage radiation. The main features are a circular waveguide with a short conical flare horn output section surrounded by an annular choke and two sets of dual posts to generate far-field circular polarization. The significant near field components of the therapeutic beam are in a transverse plane, parallel to the aperture. Heating patterns on the exposed surface of muscle phantoms and inside fat-muscle phantoms are spatially similar and relatively uniform. The leakage level is 0.8 mW/cm^2 per 100 W of forward power for direct contact and 4 mW/cm^2 per 100 W of forward power for a 1-cm air gap between aperture and planar phantoms. The uncertainty of these leakage measurements is ±2 dB. This investigation demonstrates the technical feasibility of a safe and effective direct contact microwave diathermy applicator operating at 2.45 GHz. The applicator is a viable candidate for hyperthermia appllications.

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